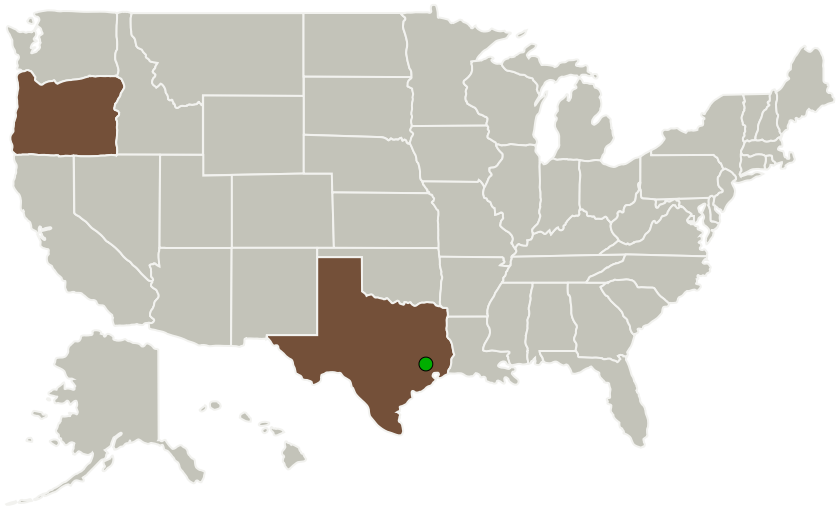
Passive, Reliable, and Robust Water Recovery from Brine, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

Brine de-watering is the final unit operation required to close the water cycle for life support aboard spacecraft. Though no such system has been demonstrated in space to date, numerous methods have been proposed and developed to various degrees. In this Phase I effort we propose to develop a versatile microgravity-compatible brine de-watering method that exploits the Brine Residual in Containment (BRIC) approach. The system is essentially passive, employing the combined effects of surface tension, wetting, and system geometry to drive and stably support the fluids involved. Our approach balances performance with simplicity, the latter which leads to a safe, clean, low-cost, fast-to-flight device with high probability of success. The broad solution approach is expected to be tolerant of pretreatments, contaminates, particulates, and widely varying input feed lines. Preliminary data suggests that the compact and lightweight approach requires only ~0.02kg of disposable support material for ~1L (~1.8 kg) of solid brine produced, and that maintenance expectations are as low as 30 minutes per 50 days per crew member. Our Phase I deliverable is a low-g drop tower-demonstrated prototype with a clear plan for rapid construction and flight qualification of a flight version for verification and validation aboard the International Space Station.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Irpi, LLC	Lead Organization	Industry	Wilsonville, Oregon
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Oregon	Texas

Project Transitions

June 2015: Project Start

December 2015: Closed out

Closeout Summary: Passive, Reliable, and Robust Water Recovery from Brine, Phase I Project Image

Closeout Documentation:
- Final Summary Chart Image*(https://techport.nasa.gov/file/139320)*

Images

Briefing Chart Image
Passive, Reliable, and Robust Water Recovery from Brine, Phase I *(https://techport.nasa.gov/image/130435)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Irpi, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

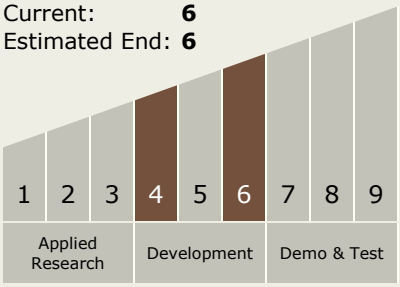
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Ryan Jenson

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.2 Water Recovery and Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System